AN ECONOMIC JUSTIFICATION FOR THE CONTINUED PROTECTION OF WHALES IN TONGA. *(POSTER)* Tongans utilised whales as a source of food until 1978 when whaling was banned by Royal Decree. In August of 1999, concurrent with a visit by representatives from the pro-whaling group the World Council of Whalers (WCW), a female humpback whale was killed and butchered near Nuku'oalofa, the Kingdom's capital. Meat from this whale was sold for local consumption. There is, therefore, with the explicit support from the WCW, a move to resume whaling in the Kingdom of Tonga and the issue is being considered within both the Tongan government and the Royal Family. However, there is a growing whale watching industry in Tonga. Thus, it is important to assess the economic impacts of whale based tourism in these islands and to consider the potential effect of a resumption of whaling on this tourism industry. A study was conducted in August 1999 to provide a preliminary assessment of the economic benefits of whale watching for the Vava'u island group. Results show that 78% (900) of air holiday-makers went whale watching and about half (400) of yacht visitors watched whales, contributing between T$78,000 and T$116,000 in direct expenditure on whale watching in Vava'u each season. Those visitors to Vava'u who came specifically to watch whales (an estimated 378 people) spent an additional T$567,847 on accommodation, food, transport, souvenirs and other items whilst in Vava'u. The five permitted whale watch operators in Vava'u spent an estimated T$54,464 on their whale watch operations and employees of those whale watch businesses spent an additional T$44,000 in Vava'u each season. Consequently, the 'use' value (the direct, indirect and induced expenditure) of whales as a tourism resource is estimated to be between T$746,000 and T$784,000 each year. The true multiplier effect of whale tourists' expenditure in the Vava'u community would exceed T$1,000,000 each year. Respondents were also asked to consider whether the hunting of whales in Tonga would reduce their likelihood of visiting. 65% of yacht visitors and 73% of air holiday-makers agreed that they would be less likely to visit Vava'u if whales were hunted there. Thus, any change in the protective status of whales and resumption of whaling practices would likely displace a large proportion of the 'whale tourists' to Tonga. There is, therefore, a likely 'opportunity cost' with regard to any lethal use of the whales. It appears unlikely that a whale watching industry could co-exist with a lethal use of whales in Tonga.

Mark B. Orams, Centre for Tourism Research, Massey University at Albany, Private Bag 102 904, North Shore MSC, New Zealand; 29 August 2000.

HUMPBACK WHALES IN FRENCH POLYNESIA, 1988-1999. *(ABSTRACT)* From 1988-99, humpback whales (*Megaptera novaeangliae*) were sighted from 15 June - 24 November near 25 of French Polynesia's islands. At seven islands, whales entered enclosed lagoons by swimming through reef passes, venturing over 5km from the sea. Nursing calves were observed; three stranded at three islands. From 1991-99 shore and boat surveys were conducted on humpback whales at Moorea in the Society Islands, and in 1999 at Rurutu in the Austral Islands. Whales were photographically identified; social groups and behavior documented; sloughed skin collected from 19 groups; and songs recorded. Cow/calf pairs were sometimes accompanied by escorts. Male competitive behaviour was observed only 50-200m off Moorea's barrier reef; some whales then entered the lagoon through 8 reef passes, venturing 3km from the sea for 20 minutes to over 48 hours; cow/calf pairs remained in the lagoon longer than other whales. From 1992-99, 110 individual whale flukes were identified at Moorea; 17 additional individuals were identified at Rurutu. Repeat sightings of whales were made within single seasons, but only six individuals were observed two or more years. Similar results were obtained from analyses of dorsal fins. In 1998 one whale was observed at Moorea and also at Palmerston Atoll, Cook Islands. A possible three-site match exists for a female at American Samoa (1994, with calf), Moorea (1996) and Rurutu (1998, with calf). French Polynesia is a breeding ground for whales that are most likely part of Antarctica's Area VI stock, and some movement to and from other breeding grounds occurs.

Michael Poole, Marine Mammal Research Program, Centre de Recherches Insulaires et Observatoire de l'Environnement (CRIOBE), B.P. 1013, Papetoai, Moorea 98728, French Polynesia (e-mail: criobe@mail.pf); 29 August 2000.

CONSISTENT HABITAT PREFERENCES OF INDIVIDUAL HUMPBACK WHALES WITHIN THE GULF OF MAINE. *(ABSTRACT)* The Gulf of Maine is one of six, relatively discrete feeding grounds of the North Atlantic humpback whale (*Megaptera novaeangliae*). While individuals have been shown to move extensively within its boundaries, there is also evidence that habitat preferences can restrict the movement and exchange of individuals. Segregation within the Gulf of Maine was examined using the sighting histories of 1,170 catalogued individuals. The majority of the sightings were made on Stellwagen Bank, where photo-identification data were collected from commercial whale watching platforms on a daily basis during the summer season (June 1-September 30), 1979-1998. Sightings were also obtained during 13 annual research cruises that targeted humpback whale habitats. Despite a strong observer bias on Stellwagen Bank, 50% (n=586) of the catalogued population was never sighted there during the summer season. Even in an immediately adjacent habitat, the Great South Channel, 26% (n=118) of the individuals sampled had no Stellwagen Bank sighting history. By contrast, 7% (n=77) of Gulf of Maine whales exhibited a preference for Stellwagen, having been sighted there in more than half of their catalogued years. The highest annual return was exhibited by an individual that was re-sighted on Stellwagen Bank in 18 of 20 catalogued years. Non-random movement and segregation within a feeding ground has the potential to bias the measurement of population parameters, such as abundance estimates based on mark-recapture data.

Jooke Robbins (e-mail: jrobbins@coastalstudies.org) and David K. Mattila, Center for Coastal Studies, PO Box 1036, Provincetown, Massachusetts 02657, USA; 29 August 2000.